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**Yates et al.**

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(54) **POSITIONAL TRACKING SYSTEMS AND METHODS**

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***G01S 1/70*** (2006.01)
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CPC ..... ***G01S 1/70*** (2013.01); ***G01S 7/481*** (2013.01)

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See application file for complete search history.

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(57) **ABSTRACT**

Optical positional tracking systems that may be used in virtual reality (VR)/augmented reality (AR) applications are described. Exemplary implementations comprise one or more receivers and one or more transmitters. Exemplary transmitters contains two orthogonal rotors that each emit a fan-shaped laser beam. Each beam is swept as the rotors are spun at constant speed. Exemplary optical receivers can be relatively small, and mounted at convenient locations on the VR display. These receivers consist of small optical detectors that may be mounted on head-mounted VR displays. Exemplary systems determine position by measuring the time at which each swept beam crosses each receiver/detector.

**65 Claims, 33 Drawing Sheets**